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Title

EMERGENCY STROBE

USER'S MANUAL

Document Number

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Issue

04

DO NOT CHANGE WITHOUT APPROVAL OF MSHA

REVISION CONTROL

03	Add cable types and Ex d enclosure	2007.11.12	PB'	PB'	MC
02	MSHA text addition	2006.09.12	RAS	RAS	PB
04	Fix general description & battery replacement	2008.12.08	PB'	PB'	JY
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TABLE OF CONTENTS

General description 3
Ordering information 4
Terminations 4
Battery replacement MSHA 5
Battery replacement IECEx 6
System wiring 6
Specifications 8

PHOTOGRAPHS

Photograph 1 General view of emergency strobe 3
Photograph 2 Internal view of emergency strobe showing terminations 4
Photograph 3 Battery removal and replacement 5

FIGURES

Figure 1 Emergency strobe type numbers 4
Figure 2 Basic emergency strobe system 6
Figure 3 Remote emergency strobe system 7

TABLES

Table 1 Emergency strobe part numbers 4
Table 2 Emergency strobe terminations 5
Table 3 MFLA5 MSHA approved power supplies 6
Table 4 MFLA5 MSHA approved cables 6
Table 5 Typical MFLA5 emergency strobe configurations 7

GENERAL DESCRIPTION

The emergency strobe type MFLA5 is a small explosion protected (Ex ia) LED based, battery powered, self flashing strobe designed to be used in evacuation applications in hazardous areas such as underground coalmines. These applications include but are not limited to the indication of emergency egress routes and the marking of refuge chamber and oxygen rescuer cache locations.

The emergency strobe is available in five colours, red, green, yellow, blue and white allowing the user to select a colour best suited for the application. The MFLA5 is primarily designed for low power underground applications but may also find application in above ground locations due to the significant brightness of the strobe.

The MFLA5 emergency strobe is designed to be installed in long cable strings or daisy chains spaced at 50 to 100 metres apart. The strobes are connected by a single pair cable that carries a control voltage that holds the emergency strobes in the off state. If this control voltage is removed or the cable is damaged the individual strobes will start flashing. The power for each strobe is derived from their internal battery.

The internal batteries have sufficient energy capacity to allow the emergency strobe to flash for several months. In the off state the batteries will last for a few years before requiring change out.

The control voltage input to each strobe is optically coupled ensuring that a fault in one emergency strobe does not affect the operation of other strobes in the daisy chain. The power consumption of each control input is so low, about 2.5mA that a typical daisy chain only consumes less than 100mA. The control input has a wide operating voltage range of eight to twenty four volts. The low power consumption coupled with the wide control input voltage range allows strings of emergency strobes to be controlled directly from the surface by a suitable power supply or zener barrier and industrial power supply.

The emergency strobe enclosure is fitted with mounting feet to allow quick installation within the mine. The enclosure has a 25mm hole in each side wall to allow cable glands to be fitted for the control signal cable.

Photograph 1 General view of Emergency Strobe type MFLA5

ORDERING INFORMATION AND PART NUMBERS

The MFLA5 is available in the following colours:

MFLA5 – CC

COLOUR
WH = WHITE
BL = BLUE
YL = YELLOW
RD = RED
GN = GREEN

Figure 1. Emergency strobe type numbers.

AUSTDAC PART NUMBERS FOR EMERGENCY STROBE TYPE MFLA5		
COLOUR	**TYPE**	**PART NUMBER**
RED	MFLA5-RD	STROB26A
YELLOW	MFLA5-YL	STROB26B
WHITE	MFLA5-WH	STROB26C
GREEN	MFLA5-GN	STROB26D
BLUE	MFLA5-BL	STROB26E

Table 1. Emergency strobe part numbers.

TERMINATIONS

All terminations of the control signal cables can be accessed by removing the front cover of the emergency strobe. The terminals are on a small printed circuit board mounted on top of the battery pack. Photograph 2 below shows the locations of terminal blocks. Table 2 below shows the function of each termination.

Photograph 2 Internal view of Emergency Strobe showing terminations

EMERGENCY STROBE TYPE MFLA5 TERMINATIONS				
#	CONNECTOR	POLARITY	FUNCTION	TYPE
1	X1	+	CONTROL SIGNAL INPUT (IN)	2.5mm^2 TERMINAL
2		-		
3	X2	+	CONTROL SIGNAL OUTPUT (OUT)	2.5mm^2 TERMINAL
4		-		
5	X3	+	OUTPUT TO STROBE MFLA3	2.5mm^2 TERMINAL
6		-		
7	X4	+	INPUT FROM BATTERY PACK	6.3mm TAB FEMALE
8		-		6.3mm TAB MALE

Table 2. Emergency strobe terminations.

BATTERY REPLACEMENT (MSHA APPROVED UNITS ONLY)

The battery pack of the emergency strobe can be replaced if the following simple procedure is carried out. Refer to photograph 3 below for further information about replacement of the battery pack.

1. Disconnect the battery pack from the control printed circuit (PCB0210A) by carefully sliding X4A and X4B away from the receptacles on the printed circuit board.
2. Undo 4 off M3 nuts holding the control printed circuit board onto the battery pack.
3. Remove the control printed circuit board from the battery pack.
4. Undo 4 off M3 nuts holding the battery pack onto the rear of the main enclosure.
5. Remove the battery pack from the main enclosure.
6. Fit new battery pack into main enclosure and secure with 4 off M3 nuts.
7. Fit the control printed circuit board onto the battery pack and secure with 4 off M3 nuts.
8. Connect the battery pack to the control printed circuit (PCB0210A) by carefully sliding X4A and X4B onto the receptacles on the printed circuit board.

Photograph 3 Battery removal and replacement (MSHA approved units only)

BATTERY REPLACEMENT (IECEx CERTIFIED UNITS ONLY)

The battery pack of IECEx certified emergency strobes is completely encapsulated within the housing forming a sealed battery pack type 6/ZM/1.4. The entire battery pack can be replaced if the following simple procedure is carried out. Disconnect the battery pack from the control printed circuit (PCB0210A) by carefully sliding X4A and X4B away from the receptacles on the printed circuit board.

1. Undo 4 off M3 nuts holding the control printed circuit board onto the battery pack.
2. Remove the control printed circuit board from the battery pack.
3. Undo 4 off M3 nuts holding the battery pack onto the rear of the main enclosure.
4. Remove the encapsulated battery pack from the main enclosure.
5. Fit new encapsulated battery pack type 6/ZM/1.4 into main enclosure and secure with 4 off M3 nuts.
6. Fit the control printed circuit board onto the battery pack and secure with 4 off M3 nuts.
7. Connect the battery pack to the control printed circuit (PCB0210A) by carefully sliding X4A and X4B onto the receptacles on the printed circuit board.

SYSTEM WIRING

The placing of emergency strobes into daisy chains is a simple matter of connecting the strobes together with a suitable two-wire or single pair cable. This cable must be of sufficiently low resistance to ensure that voltage drop along the cable does not violate the minimum input voltage specification of the emergency strobe (8.0 volts). Austdac recommends that 2.5mm^2 cable be used for most installations as it provides a good resistance, strength and cost trade off.

The control signal can be derived from any suitable power source with a maximum voltage of 27.0 volts. This power source can be an industrial power supply, an explosion protected power supply or a zener barrier depending on the regulations and legislation applicable in the country of installation.

MSHA approval restricts the power source to a nominal 12 volts and only allows the power supply types listed in table 3. The MSHA approved power supplies must be located in a safe area or an MSHA approved flameproof enclosure. Wiring from the power to the strobes and between the strobes must be of a MSHA approved type as listed in table 4.

Normal installation codes of practice provisions apply in all other countries. A system description document should also be done in accordance with IEC60079-25 in these other jurisdictions.

MSHA APPROVED POWER SUPPLIES FOR USE WITH EMERGENCY STROBE TYPE MFLA5			
#	MANUFACTURER	PART NUMBER	MSHA APPROVAL
1	SMC POWER SUPPLY	B742-001	IA-88-1
2	COMTROL POWER SUPPLY	PS1510	IA-369-0

TABLE 3. MFLA5 system MSHA approved power supplies.

MSHA APPROVED CABLES FOR USE WITH EMERGENCY STROBE TYPE MFLA5			
#	MANUFACTURER	PART NUMBER	MSHA APPROVAL
1	COLEMAN CABLE INC	12 AWG 22228	P-241-3-MSHA
2	COLEMAN CABLE INC	16 AWG 22226	P-241-3-MSHA

TABLE 4. MFLA5 system MSHA approved cables.

The emergency strobes should be spaced at intervals that suit the evacuation system design and visibility issues that may be present after an incident underground. A typical system is shown in figure 2 below.

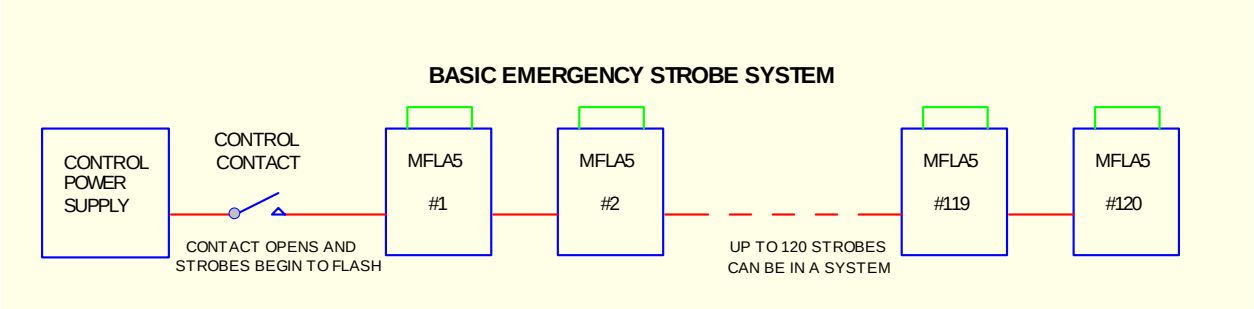

Figure 2. Basic emergency strobe system

The control power supply and control contact can be located a considerable distance away from the start of the daisy chain allowing the control contact to be on the surface and the daisy chain underground. This type of configuration has a lead in distance ranging from a few hundred metres up to 10,000 metres. This type of system is shown in figure 3 below.

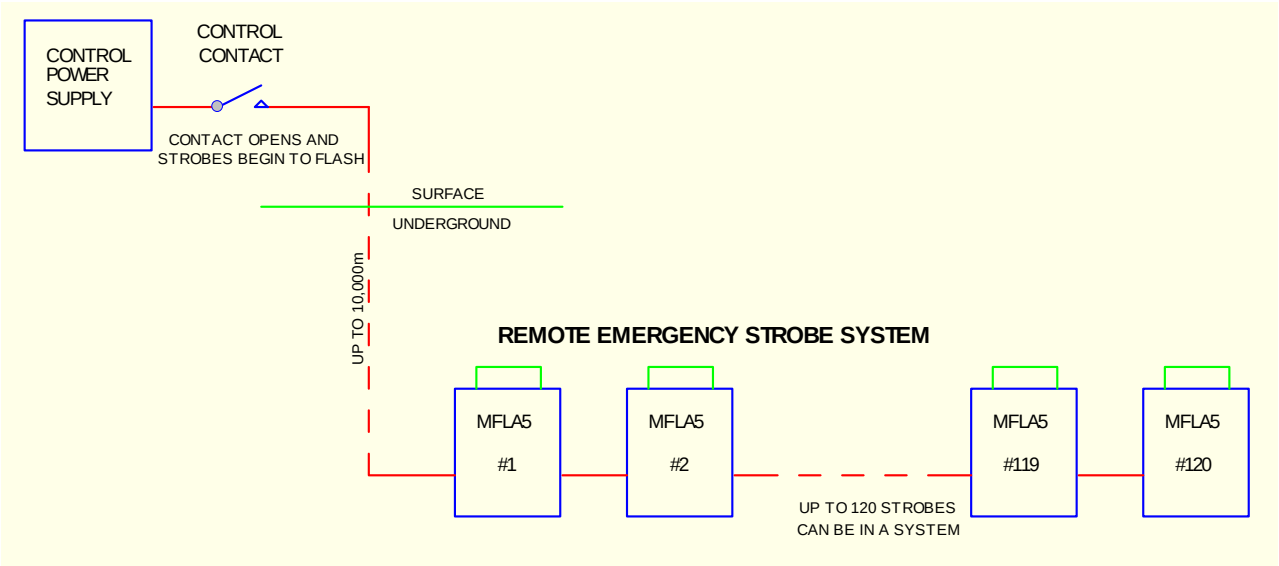

Figure 3. Remote emergency strobe system

Many different emergency evacuation system configurations and lengths can be implemented with or without lead in using the MFLA5 emergency strobe; table 4 below shows a few typical system configurations. Refer to Austdac to have a special configuration designed, if your requirements are not covered by a typical system configuration.

TYPICAL MFLA5 EMERGENCY STROBE SYSTEM CONFIGURATIONS					
CONTROL VOLTAGE	**LEAD IN LENGTH**	**WIRE SIZE**	**SPACING**	**NUMBER OF MFLA5 STROBES**	**TOTAL DISTANCE COVERED**
24V#	0m	2.5mm^2 or 12AWG	50m	100	5000m
24V#	0m	1.5mm^2 or 16AWG	50m	80	4000m
18V#	0m	2.5mm^2 or 12AWG	50m	85	4250m
18V#	0m	1.5mm^2 or 16AWG	50m	70	3500m
14V#	0m	2.5mm^2 or 12AWG	50m	70	3500m
14V#	0m	1.5mm^2 or 16AWG	50m	55	2750m
12V	0m	2.5mm^2 or 12AWG	50m	55	2750m
12V	0m	1.5mm^2 or 16AWG	50m	45	2250m
24V#	2000m	2.5mm^2 or 12AWG	50m	85	4250m
24V#	5000m	2.5mm^2 or 12AWG	50m	60	3000m
24V#	8000m	2.5mm^2 or 12AWG	50m	45	2250m
24V#	10000m	2.5mm^2 or 12AWG	50m	37	1850m
# - NOT A VALID MSHA VOLTAGE CANNOT BE USED IN A MSHA APPROVED INSTALLATION					

Table 5. Typical MFLA5 emergency strobe configurations.

SPECIFICATIONS

Control signal voltage range ..... 8V – 28V
MSHA approved control signal range ..... 8V – 12V
Control signal current ..... 2.5mA max
Maximum number of strobes in string ..... 100 with 24V control supply and 2.5mm^2 cable
Maximum number of strobes in a MSHA approved string ..... 55 with 12V and 12 AWG cable
MSHA approved 12 AWG cable ..... Coleman Cable Inc P/No. 22228 (P-241-3-MSHA)
MSHA approved 16 AWG cable ..... Coleman Cable Inc P/No. 22226 (P-241-3-MSHA)
Flash rate ..... ~1Hz
Colour ..... Red, Green, Yellow, Blue and White
Luminous intensity red ..... > 12,000 mcd
Luminous intensity green ..... > 18,000 mcd
Luminous intensity yellow ..... > 12,000 mcd
Luminous intensity blue ..... > 5,400 mcd
Luminous intensity white ..... > 20,000 mcd
Terminations ..... 4 off cage clamp terminals
Maximum conductor size ..... 2.5mm^2 or 12 AWG
Size ..... 193mm (H) x 132mm (W) x 110mm (D)
Mounting ..... 2 off M12 holes in mounting bar
Mounting centres 153mm
Ingress protection IP55
Mass 2kg
Operating temperature range ..... -10 to +50°C